Environmental Enrichment for Animals Used in Experimentation

PETA

Contents

Overview of Environmental Enrichment for Animals Used in Experimentation

There are two major elements required for the species routinely used in laboratory experimentation:

1. Social contact with conspecifics. Group housing should be considered the norm with special exceptions only with a documented and specific scientific justification. We would like to be apprised of any experimental conditions requiring single housing, so that we may work with animal care specialists on potential methods of amelioration.

2. Sufficient space and a sufficiently complex environment that allows the animals to perform species-specific natural behaviors.

Rodents

Caging

Solid flooring is one of the most important considerations for rodent welfare. Floors made of wire mesh or grid can cause pain, pressure sores, and other health problems. Common laboratory cages are available with solid floors and wire lids. The use of elevated wire lids allows space for more complex enrichment such as shelving (**Figure 1,** left). Mice and rats are uncomfortable in open spaces; therefore the complexity of their environment is more important than providing additional space per animal.

Figure 1: Macrolon Type IV caging for mice. Elevated lid shown on left. All photographs are taken from Ottesen et al., 2004.

Bedding and nesting material

Rodents are generally social; however, they also need to be able to hide and nest, and shredding is an important behavior for stress relief. Therefore the bedding material should be made of material that can be shredded, and there should be sufficient quantity to provide depth for hiding and nesting. An inexpensive and convenient option is paper towels. In situations where the composition of nesting material is important, certified NestPack bedding is a good choice, in that it provides a combination of bedding and nesting materials with which the animals build their own nests. Other suggested shredding materials are filter paper, Nestlets, Alpha-Nests, or Enviro-Dri materials.

Bedding should be changed regularly; however, in the case of male mice, who have an especially well-developed olfactory sense, it is recommended that some soiled bedding be returned with the fresh bedding to reduce aggression caused by bedding changes, as familiar smells are important. The addition of hiding spaces can also alleviate potential aggression between male mice after bedding changes.

Environmental stimulation

Rodents require a complex environment; several forms of structural enrichment are recommended (e.g., an exercise wheel, nest box, tubes, chew sticks, or wooden blocks). Ideally, some of these structures should be opaque to provide an element of privacy. Some available plastic structures are dark or slightly opaque, allowing observation of the animals while providing a modicum of privacy. In addition, mice and rats benefit from the provision of vertical and horizontal dividers, mazes, and inserts for climbing (climbing racks, ladders, platforms, climbing trees, ropes, and chains) (**Figure 2, right**). Lastly, rodents have strong urges for foraging that can be satisfied by scattering food on the floor amongst the bedding. For proper maintenance of their front teeth, rodents require hard food substrates to gnaw on such as food pellets, carrots, or softwood sticks.

Figure 2: Provision of shelving for group-housed rats.

Socialization

Regarding socialization, group housing should be the norm. It is important that the animals be kept in stable groups and that unfamiliar rodents are not introduced. Group housing of adult male rats can be difficult as they are territorial and tend to fight. However, they can be group housed if given sufficient space and places to hide. Since frequent human handling often occurs with laboratory animals, these animals should be habituated to human contact from an early age (soon after weaning). Lastly, the use of radios can be beneficial in mitigating extraneous noise; however, care should be taken in making sure the radio noise itself is not a source of stress.

Special considerations for Guinea pigs

The most important concern for this species is group housing (**Figure 3, at right below**). We would therefore reiterate, with special emphasis in the case of guinea pigs, that group housing

should be the norm. When singly caged, guinea pigs must never be kept isolated, but provisions should be made for visual, auditory, and olfactory contact with other guinea pigs.

Figure 3: Example of flexible pen system for social housing of guinea pigs.

Opportunities should be provided for foraging, particularly through the provision of fresh hay (as opposed to cubed hay), which also contributes to environmental enrichment and can be used for nesting, hiding, and playing. Guinea pigs require an adequate supply of Vitamin C. Caging should allow sufficient space for exercise. Lastly, guinea pigs prefer quiet rooms as they are easily stressed by chronic noise. The use of radios can be beneficial in mitigating extraneous noise; however, care should be taken in making sure the radio noise itself is not a source of stress.

Rabbits

Caging

Pen systems are the preferred housing for rabbits (**Figure 4**); however, if cages are used, they should have solid floors and tiered stacking of cages should be avoided. At least one wall of the enclosure should be mesh or transparent so the animals can see out, and rabbits should have visual contact with other rabbits. Minimum cage sizes should be established that allow for a normal range of behaviors including stretching up on hind legs, digging, and hiding, and should be large enough to permit at least three hops in one direction. Shelving is very important and cages should provide enough space for a shelf that allows for a resting place as well as an improved visual field. Digging boxes can be provided in the form of a clear plastic box with pelleted newspaper litter.

Figure 4: Enclosure for social housing of rabbits. Platforms, dividers, shelters, and hayracks supply environmental complexity.

Bedding and nesting material

Rabbits prefer straw or hay as nesting material and these materials also promote foraging behavior. Rabbits also need opportunities to burrow and a physical substrate for digging. Nest boxes should be provided for breeding females and should be designed to prevent

littering does from seeing each other, which can trigger infanticide behavior.

Environmental stimulation

One of the primary activities rabbits engage in is gnawing; the provision of hard foods and vegetables and chew toys is therefore essential. Food treats provide variety and enrichment for rabbits; bananas are particularly favored by rabbits. When new, toys can illicit curiosity and intellectual stimulation; however, the toys must be rotated regularly to have this effect. Such enrichment need not be expensive; for example, apple tree branches can substantially improve rabbits' quality of life.

A major environmental enrichment is the addition of vertical shelving or raised floor areas that allow the rabbits to view their surroundings (and, as mentioned above for rodents, also provide exercise). Vertical shelving also allows places of refuge, without restricting access to the cage. The introduction of structures such as refuges and partitions provide group-housed rabbits with the ability to initiate or withdraw from social contact at will, and provide rabbits with additional places to scent mark—an important social behavior that helps to reinforce hierarchies.

Rabbits need to exercise; this is especially crucial if rabbits are singly housed in cages that are inherently smaller. Ideally, rabbits should be provided with a penned, grassy area outdoors, fully enclosed to protect from predators and fitted with fine mesh around the lower sides to keep the rabbits from digging out and other animals from digging in. Additional means of providing exercise are bigger cages and vertical spaces or penning them in groups on the floor.

Socialization

Rabbits are gregarious, social animals—who seek out and require visual, auditory, olfactory, and tactile access to one another—and every effort must be made to avoid caging these animals individually, in isolation. Rabbits housed in single cages have been found to perform stereotypic behaviors, including bar-biting and fur pulling; and behavioral studies indicate that rabbits are highly motivated to seek out social contact with conspecifics. Pair- or group-housed rabbits spend significant amounts of their time in close proximity to others; and it should be the norm for young rabbits and older female rabbits to be housed in harmonious pairs or social groups. While neutered adult males can usually be safely housed with others, housing

intact adult male rabbits with others can present some challenges due to aggression and territorial fighting. However, a level of tactile contact with conspecifics can be achieved for these rabbits by housing them in cages adjacent to the cages of other rabbits, separated by a mesh sufficiently fine to keep the animals separate but still allow the cage neighbors to see and lie next to each other.

A further advantage of group-housing rabbits is the increased space available to occupants; group-housed rabbits have been observed lying in the rabbit-typical full stretched-out, lateral recumbent position, which singly caged rabbits usually cannot adopt due to insufficient space.

Additional considerations

It is important to note that, as a prey species, rabbits will hide signs of illness if possible, but a reduction of food intake may be an early sign. Thus, the health care routine should include weighing the animals each time they are removed from their cage and noting any decreases in weight. Feeding behavior should also be monitored by observation. A decrease in weight or feeding could be indicative of environmental stress.

Pigs

Bedding and nesting material

An important enrichment for pigs is the availability of roughage and rooting material. Hay, especially long, natural straw, and oat hulls provide for both; a substrate such as peat provides additional rooting material. Straw can also serve as bedding material and is necessary to reduce foot and joint irritations and inflammations. Straw is crucial for the normal behaviors of pre-parturient sows.

Environmental stimulation

Pigs should be provided with chewable 'toys' such as strips of cloth, rubber tires or tubing. These can be suspended so that they are not contaminated by manure, which is unappealing to the pigs. Pigs prefer pliable objects to harder objects such as chains.

Socialization

Group housing should be the norm. It is important that the animals be kept in stable groups and that unfamiliar animals are not introduced. It is also comforting for a familiar pig from the group to be brought along when a pig is removed for a procedure.

Additional considerations

It is important not to coerce pigs – like dogs, they are intelligent animals who can easily be trained and respond better to positive reinforcement than to punishment.

Dogs

Caging

Dogs are highly intelligent, social animals and require a complex environment, with opportunities for playing, resting, and exercising (**Figure 5, below**). Cages should contain raised platforms, ideally constructed so they do not block the existing floor space. Raised platforms enable the dogs to view the rest of the room, and the entire room should be visible from each pen (views should not be obstructed by other pens). In addition, structures should be enclosed on two or three sides for the dogs to hide in when they desire privacy or space; this design will also alleviate barking in the kennels. A minimum cage size should be reflective of the size and number of animals. European specifications (Council of Europe, ETS 123, Appendix A, 2006) are preferred over those provided by the U.S. National Research Council (The Guide for the Care and Use of Laboratory Animals, 1996).

Figure 5: Enclosure for social housing of dogs, including environmental enrichments such as beds, shelving, ramps and suspended toys.

Cages should be located in a room that provides as natural an atmosphere as possible, for example, with windows and/or skylights

for natural lighting. An environment such as long corridors with animals in “cells” should be avoided. Animals should be exercised daily by means of outdoor walks and play.

Bedding

There should be a raised bed (e.g., plastic beds with fleece linings). Some minimal amount of substrate such as sawdust is recommended for solid flooring to soak up urine. Note that if dogs are allowed access to outdoor runs, they will normally use this area for urination and defecation.

Environmental stimulation

Dog toys should be suspended from the ceiling on sprung chains, just off the floor, so that dogs can manipulate them while lying down, but so that they do not get as dirty and importantly, so that dominant dogs cannot monopolize the toys. For dogs, as well as for other animals, toys should be rotated frequently to alleviate boredom. Dogs should be exercised daily by removal to a separate area, with other dogs where possible, and with staff supervision and interaction; exceptions should be made only with scientific or veterinary justification.

Socialization

The products of social selection, dogs have been bred to have a strong attachment to humans; consequently, the stress suffered by dogs in laboratories as a result of insufficient human attention has a measurable impact on the dogs’ physiological processes, including metabolism and heart rate. Humans should spend at least 90 minutes each day playing with dogs or providing positive social interaction, and also training dogs to cooperate in procedures through positive reinforcement and/or clicker training. Employees responsible for providing dogs with social human-based enrichment should, of course, not be the same employees responsible for conducting procedures on the dogs, as these procedures can be painful, frightening, and confusing for the dogs. Using the same employees for both positive and negative experiences creates additional stress for the animals and it is counterproductive to have employees associated in the dogs’ minds with fear, alarm, and dread, attempt to offer positive socialization.

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